

Application Ser. No.: 10/586,766

Title: ROLLING FLUID MACHINE ESPECIALLY WITH A LIQUID SPRAYING AT THE OUTPUT

Response to Office Action dated: October 20, 2009

Amendments to the Specification:

Please amend the paragraph beginning at page 1, line 21 (second paragraph under "Background Art") with the following amended paragraph:

-- A published Czech application PV 1999-4624, the disclosure of which is incorporated by reference, describes a room air moisturizer. Its design uses the above described rolling fluid machine. In this embodiment the outlet comprises a channel provided in the upper end of the precession shaft. A part of the liquid leaves the tank through the first outlet opening at the end of the precession shaft and is sprayed by pressure and the precession movement of the shaft.

[[Other]] Another part of the liquid leaves the tank through the second outlet opening to the area between the first friction surface and the second friction surface, thereby improving [[so]] their mutual movements. The remaining portion of the liquid leaves the tank through the third outlet opening between the first friction surface and the lid of the tank. --

Please amend the paragraph beginning at page 2, line 27 (second paragraph under "Disclosure of the Invention") and continuing to page 3, line 2, with the following amended paragraph:

-- Use[[Using]] of at least one additional channel between the space [[bellow]] below and the space above the rotor, and its sizing, makes it possible for the rolling fluid machine according to the invention to choose what portion of the supplied energy will be converted to mechanical energy (rotor rotations) and what portion of the supplied energy will be converted to kinetic energy of the exiting stream of fluid. Thus, a rolling fluid machine can be designed with a desired ratio of the fluid flow rate at the outlet and rotor rotation, respectively, and the desired torsional moment of the rotor. By increasing the number and/or the cross section of the additional channels, the flow rate of the fluid at the outlet will increase and the rotor revolutions will fall. --

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Please amend the paragraph beginning at page 3, line 30 (first paragraph under "Modes for Carrying Out the Invention") and continuing to page 4, line 15, with the following amended paragraph:

-- Fig. 1 shows the first example of the rolling fluid machine where the driving medium is liquid. The machine has a liquid spraying system at the output. The liquid driven machine comprises a chamber 1. At one end of the chamber 1, there is the inlet 2 of fluid. On the opposite end of the chamber 1, there are openings configured in a circle used as the outlet of fluid. The inner surface of the chamber 1 has the shape of a truncated cone that ~~[[narrows]]~~ narrows in the direction of the flow. In the chamber 1, there is a rolling rotor installed in a manner enabling both rolling and swinging. The rolling rotor 4 is designed as a hollow hemisphere, the open face of which is oriented against the flow of fluid. The rolling rotor 4 can have any rotary shape, for instance a sphere, hemisphere, cone etc. Accommodating the rolling rotor 4 in a manner enabling both rolling and swinging can be achieved through any known design solution. The rotary and swinging accommodation of the rotor 4 shown in ~~[[the]]~~ Fig. 1 comprises a shaft 9 of the rolling rotor 4 that passes with some clearance through the central opening 14 in the chamber 1. Inside the chamber 1 the shaft 9 has a projection 10, the diameter of which is bigger than the diameter of the central opening 15 in the chamber 1 and, therefore, the projection 10 is pushed by the pressure of the fluid flowing towards the rotor 4 on the inner face of the surface of the chamber 1.

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Please amend the paragraph beginning at page 4, line 27 (second paragraph under "Disclosure of the Invention") and continuing to page 3, line 2, with the following amended paragraph:

-- In order to supply more fluid to the outlet 3, the space ~~[[bellow]]~~ below the rotor 4 is interconnected with the space 6 above the rotor 4 by the additional channels 7. In this embodiment, the channels consist of two openings in the wall of the rotor 4. The desired flow rate may easily be achieved by choosing the number and/or the cross section of the additional channels 7. ~~This is also the way how to control~~ By choosing the desired number and/or the cross section of the additional channels the torsional moment of the shaft 9 is also controlled. --

Please amend the paragraph beginning at page 5, line 26, with the following amended paragraph:

-- When passing through the chamber 1, the fluid flows from the space 5, located ~~[[bellow]]~~ below the rotor 4, to the space 6, located above the rotor 4, through the clearance between the rolling rotor 4 and the wall of the chamber 1 and through the additional channels 7. The flow rate may be controlled by choosing the number of additional channels or their cross sectional size. --

Please amend the paragraph beginning at page 5, line 32 and continuing to page 6, line 8, with the following amended paragraph:

-- The embodiment shown in Fig. 2 shows another possibility of how to design the additional channel. In this embodiment, the rolling rotor 4 has the shape of a hollow truncated cone, the open end of which is oriented against the direction of the flow of the liquid. The additional channel 7 interconnects with the space 5 ~~[[bellow]]~~ below the rotor 4 with the space 6 above the rotor 4 but, unlike the design shown in Fig. 1, the additional channel 7 runs outside the inner space of the chamber 1. Such a design provides for a simple installation of the control vavle 8 to the additional channel 7 allowing for an easy control of the flow rate of the liquid even during the operation of the rolling fluid machine. The function of the embodiment shown in Fig. 2 is identical to that of the already described embodiment shown in Fig. 1. --

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Please amend the paragraph beginning at page 6, line 10 with the following amended paragraph:

-- Fig. 3 shows an example of using the additional channels 7 in a fountain for air moisturizing or for decorative purposes. The fountain comprises ~~[[of]]~~ a rolling fluid machine, the chamber 1 of which is fixed to the wall of a hollow vessel 12 with a nut 11. The vessel 12 is placed in a tank of liquid which is not shown in ~~[[the]]~~ Fig. 3. The chamber 1 of the rolling fluid machine is interconnected by an inlet hose with a pump, not shown. --

Please amend the paragraph beginning at page 6, line 32, and continuing to page 7, line 1, with the following amended paragraph:

-- When passing through the chamber 1, the liquid flows from the space 5 ~~[[bellow]]~~ below the rotor 4 to the space 6 above the rotor through the clearance between the rolling rotor 4 and the wall of the chamber 1 and also through the additional channels 7. --

Please amend the paragraph beginning at page 7, line 3 with the following amended paragraph:

-- A small quantity of liquid leaks from the chamber 1 ~~[[trough]]~~ through the central opening 15 through which the shaft 9 passes and the liquid flows on the surface of the vessel 12 back to the tank, not shown in ~~[[the]]~~ Fig. 3. A substantial portion of the liquid flow leaves the space 6 above the rotor 4 via the entrances 13 and enters the hollow shaft 9 and continues through the outlet 3 to the spraying head 14 from where it is sprayed out and, thereafter, it flows on the surface of the vessel 12 back to the tank, not shown in ~~[[the]]~~ Fig. 3.--

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Please amend the paragraph beginning at page 7, line 25 with the following amended paragraph:

-- In all above described embodiments, the effective resistance faced by the flowing liquid may be exactly controlled by choosing the number and/or the cross section of the additional channels 7. [[This]] In this way it is possible to choose the amount of energy of the flow to be transformed to the rotational mechanical energy. This why we can design a rolling fluid machine with a desired outlet 3 flow rate and required rotational speed or torsional moment of the rotor 4. [[Increase in]] Increasing the number and/or enlarging the cross section of the additional channels 7 will increase the flow of fluid at the outlet 3 and decrease the [[sped]] speed of rotation of the rotor 4. --

Please amend the paragraph beginning at page 9, line 4 with the following amended paragraph:

-- For the experts it is clear that the only restriction of the design of the additional channels 7 is the fact that the space 5 [[bellow]] below the rotor 4 and the space 6 above the rotor 4 have to be interconnected. Their number, shape and specific location is determined by the requirements of the amount of the flow and the use of the machine (powering of the rotary tools, air moisturizing fountains, decorative fountains, etc.). Specific types of additional channels 7 may be freely combined in a single design of the rolling fluid machine. --